

Write in simplest form.

5.  $\frac{7-3}{3-1}$

6.  $\frac{3-5}{6-0}$

7.  $\frac{8-(-4)}{3-7}$

8.  $\frac{-1-2}{0-5}$

9.  $\frac{-6-(-4)}{-2-6}$

10.  $\frac{0-1}{1-0}$

**6.1 Activity: Exploring Rate of Change Day 42**

The diagram at the right shows the side view of a ski lift.

- What is the vertical change from A to B? From B to C? From C to D? **10, 40, 10**
- What is the horizontal change from A to B? From B to C? From C to D? **30, 30, 30**
- Find the ratio of the vertical change to the horizontal change for each section of the ski lift.
- Which section is the steepest? How does the ratio for that section compare to the ratios of the other sections?

$\frac{10}{30} = \frac{1}{3}$      $\frac{40}{30} = \frac{4}{3}$      $\frac{10}{30} = \frac{1}{3}$   
**A to B    B to C    C to D**  
**Steepest**

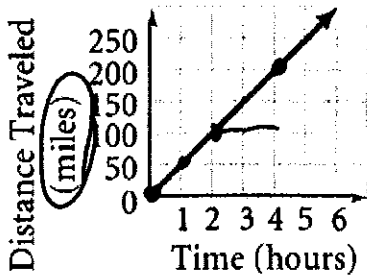
**Rate of change** allows you to see the relationship between two quantities that are changing. If one quantity depends on the other, then the following is true.

$$\text{rate of change} = \frac{\text{change in the dependent variable}}{\text{change in the independent variable}}$$

2 Find the rate of change of the data in the graph.

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**A Moving Automobile**

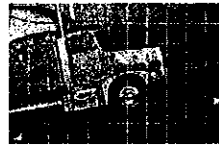
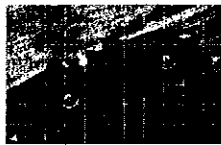


$$\text{rate of change} = \frac{\text{vertical change}}{\text{horizontal change}} = \text{slope}$$

$$\frac{50 \text{ mi}}{1 \text{ hr}} = 50 \text{ mph}$$

$$\frac{100}{2} = 50$$

Some roads are steeper than others. A steeper road has a greater rate of change.

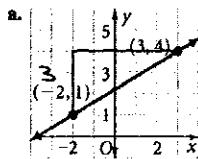


The slope of a line is its rate of change.

$$\text{slope} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}}$$

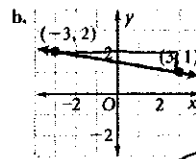
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3 Find the slope of each line.



$$\frac{\text{rise } 3}{\text{run } 5}$$

up  
right = positive  
↖  
uphill



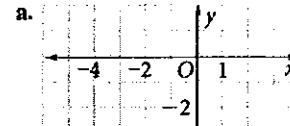
$$\frac{\text{up } 1}{\text{left } 6} = -\frac{1}{6}$$

up  
left = negative  
↘  
downhill

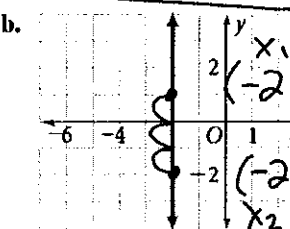
Formula	Slope
	$m = \text{slope} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$ , where $x_2 - x_1 \neq 0$
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<p>4 Find the slope of the line through each pair of points.</p>	
a. C(2,5) and D(4,7)	b. P(-1,4) and Q(3,-2)
$x_1, y_1, x_2, y_2$	$x_1, y_1, x_2, y_2$
c. M(a,b) and N(c,d)	
$x_1, y_1, x_2, y_2$	
$= \frac{7-5}{4-2}$	$m = \frac{-2-4}{3-(-1)}$
$= \frac{2}{2}$	$m = \frac{d-b}{c-a}$
$m = 1$	$m = \frac{-6}{4}$
	$m = \frac{-3}{2}$
	$-\frac{3}{2}$

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5 Find the slope of each line.

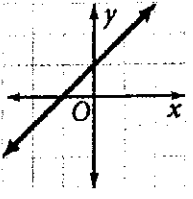
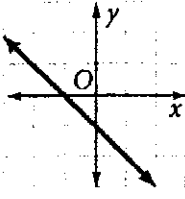
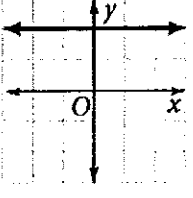
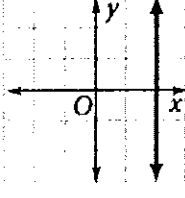
a.   $\frac{\text{rise}}{\text{run}} = \frac{0}{2} = 0$

**Horizontal Lines**  
 $m = 0$

b.   $m = \frac{-2-1}{-2-(-2)} = \frac{-3}{0}$

$\frac{\text{rise}}{\text{run}} = \frac{3}{0} \rightarrow m \text{ is undefined}$

All Vertical Lines are undefined

Summary	Slopes of Lines		
	A line with positive slope slants upward from left to right.		A line with negative slope slants downward from left to right.
	A line with a slope of 0 is horizontal.		A line with an undefined slope is vertical.